

International Journal of Theoretical Physics —Volume 37, 1998

A journal of original research and reviews in theoretical physics and related mathematics, dedicated to the unification of physics. Papers on the interface between quantum theory and space-time structure are especially invited, including quantum communication, quantum computers, quantum cosmology, quantum geometry, quantum gravity, quantum logics, quantum networks, quantum set theory, quantum space-time, and quantum topology.

EDITOR

David Finkelstein

Georgia Institute of Technology, Atlanta, Georgia

EDITORIAL BOARD

Peter G. Bergmann, Syracuse University, Syracuse, New York

Sheldon Glashow, Harvard University, Cambridge, Massachusetts

Christopher Isham, Imperial College, London, England

Tsung-Dao Lee, Columbia University, New York, New York

Yuval Ne'eman, Tel Aviv University, Tel Aviv, Israel

Roger Penrose, Oxford University, Oxford, England

Ilya Prigogine, Free University of Brussels, Brussels, Belgium

Sylvia Pulmannová, Slovak Academy of Sciences, Bratislava, Slovakia

Rafael D. Sorkin, Syracuse University, Syracuse, New York

Leonard Susskind, Stanford University, Stanford, California

Andrzej Trautman, Institute for Theoretical Physics, University of Warsaw, Warsaw, Poland

C. F. von Weizsäcker, Max Planck Institute, Starnberg, Germany

Steven Weinberg, University of Texas at Austin, Austin, Texas

Chen-Ning Yang, State University of New York at Stony Brook, Stony Brook, New York

EDITORIAL ASSISTANTS

Theodore Heath, Georgia Institute of Technology, Atlanta, Georgia

International Journal of Theoretical Physics is published monthly by Plenum Publishing Corporation, 233 Spring Street, New York, N.Y. 10013. *International Journal of Theoretical Physics* is abstracted or indexed in Chemical Abstracts, Current Contents, INSPEC—Physics Abstracts, Mathematical Reviews, Referativnyi Zhurnal, Science Citation Index, Science Research Abstracts—Part A, and Zentralblatt für Mathematik. © 1998 Plenum Publishing Corporation. *International Journal of Theoretical Physics* participates in the Copyright Clearance Center (CCC) Transactional Reporting Service. The appearance of a code line at the bottom of the first page of an article in this journal indicates the copyright owner's consent that copies of the article may be made for personal or internal use. However, this consent is given on the condition that the copier pay the flat fee of \$15.00 per copy per article (no additional per-page fees) directly to the Copyright Clearance Center, Inc., 222 Rosewood Drive, Danvers, Massachusetts 01923, for all copying not explicitly permitted by Sections 107 or 108 of the U.S. Copyright Law. The CCC is a nonprofit clearinghouse for the payment of photocopying fees by libraries and other users registered with the CCC. Therefore, this consent does not extend to other kinds of copying, such as copying for general distribution, for advertising or promotional purposes, for creating new collective works, or for resale, nor to the reprinting of figures, tables, and text excerpts. 0020-7748/98 \$15.00

Advertising inquiries should be addressed to Advertising Sales, Plenum Publishing Corporation, 233 Spring Street, New York, N.Y. 10013—telephone (212) 620-8495 and fax (212) 647-1898.

Subscription inquiries and subscription orders should be addressed to the publisher at Subscription Department, Plenum Publishing Corporation, 233 Spring Street, New York, N.Y. 10013 or faxed to the Subscription Department at its number (212) 807-1047, or may be telephoned to the Subscription Department's Journal Customer Service at (212) 620-8468, -8470, -8472, or -8082. Subscription rates:

Volume 37, 1998 (12 issues)—Traditional print subscription: \$855.00 (outside the U.S., \$1,000.00). Electronic subscription: \$855.00 (outside the U.S., \$940.00). Combination print and electronic subscription: \$1,070.00 (outside the U.S., \$1,250.00).

Volume 38, 1999 (12 issues)—Traditional print subscription: \$950.00 (outside the U.S., \$1,110.00). Electronic subscription: \$950.00 (outside the U.S., \$1,110.00). Combination print and electronic subscription: \$1,190.00 (outside the U.S., \$1,355.00).

Periodicals postage paid at New York, N.Y., and at additional mailing offices. Postmaster: Send address changes to *International Journal of Theoretical Physics*, Plenum Publishing Corporation, 233 Spring Street, New York, N.Y. 10013.

Printed in the USA.

QC1
.I64

International Journal of Theoretical Physics is published monthly by Plenum Publishing Corporation, 233 Spring Street, New York, N.Y. 10013. *International Journal of Theoretical Physics* is abstracted or indexed in Chemical Abstracts, Current Contents, INSPEC—Physics Abstracts, Mathematical Reviews, Referativnyi Zhurnal, Science Citation Index, Science Research Abstracts—Part A, and Zentralblatt für Mathematik. © 1998 Plenum Publishing Corporation. *International Journal of Theoretical Physics* participates in the Copyright Clearance Center (CCC) Transactional Reporting Service. The appearance of a code line at the bottom of the first page of an article in this journal indicates the copyright owner's consent that copies of the article may be made for personal or internal use. However, this consent is given on the condition that the copier pay the flat fee of \$15.00 per copy per article (no additional per-page fees) directly to the Copyright Clearance Center, Inc., 222 Rosewood Drive, Danvers, Massachusetts 01923, for all copying not explicitly permitted by Sections 107 or 108 of the U.S. Copyright Law. The CCC is a nonprofit clearinghouse for the payment of photocopying fees by libraries and other users registered with the CCC. Therefore, this consent does not extend to other kinds of copying, such as copying for general distribution, for advertising or promotional purposes, for creating new collective works, or for resale, nor to the reprinting of figures, tables, and text excerpts. 0020-7748/98 \$15.00

Advertising inquiries should be addressed to Advertising Sales, Plenum Publishing Corporation, 233 Spring Street, New York, N.Y. 10013—telephone (212) 620-8495 and fax (212) 647-1898.

Subscription inquiries and subscription orders should be addressed to the publisher at Subscription Department, Plenum Publishing Corporation, 233 Spring Street, New York, N.Y. 10013 or faxed to the Subscription Department at its number (212) 807-1047, or may be telephoned to the Subscription Department's Journal Customer Service at (212) 620-8468, -8470, -8472, or -8082.

CONTENTS

Special Issue: Proceedings of the International Quantum Structures Association 1996	
Guest Editors: Karl-Eberhard Hellwig, Michael Keyl, Werner Stulpe, and Mathias Trucks	
Foreword	1
<i>Karl-Eberhard Hellwig, Michael Keyl, Werner Stulpe, and Mathias Trucks</i>	
On Extremal Orthoposets Without Forbidden Substructures	3
<i>Peter Brass</i>	
Coverings of [Mon] and Minimal Orthomodular Lattices	11
<i>J. C. Carréga</i>	
Ideals and Filters in D-Posets	17
<i>Ferdinand Chovanec and Eva Rybáriková</i>	
Soler's Theorem and Characterization of Inner Product Spaces	23
<i>Anatolij Dvurečenskij</i>	
From Basic Logic to Quantum Logics with Cut-Elimination	31
<i>Claudia Faggian and Giovanni Sambin</i>	
Abelian Extensions of Quantum Logics	39
<i>David V. Feldman and Alexander Wilce</i>	
The Transition to Unigroups	45
<i>D. J. Foulis, R. J. Greechie, and M. K. Bennett</i>	
Quantum MV-Algebras and Commutativity	65
<i>Roberto Giuntini</i>	
A Survey of E-Test Spaces	75
<i>Stanley Gudder</i>	
On the Geometry of Orthomodular Spaces Over Fields of Power Series	85
<i>Hans A. Keller and Herminia Ochsenius A.</i>	
Boolean D-Posets as the Factor Spaces	93
<i>František Kôpka</i>	
Unitary Self-Adjoint Logics of Projections	103
<i>Marjan Matvejchuk</i>	
Some Characterizations of the Underlying Division Ring of a Hilbert Lattice by Automorphisms	109
<i>René Mayet</i>	

Quasi-Heyting Algebras: A New Class of Lattices <i>William David Miller</i>	115
Categorical Structures in Physics <i>D. J. Moore</i>	121
Gleason-Type Theorem for Linear Spaces Over the Field of Four Elements <i>Danir Mushtari</i>	127
Decomposition of D-Sets <i>Olga Nánásiová</i>	131
Quantum Logics with Given Centers and Variable State Spaces <i>Mirko Navara and Pavel Pták</i>	139
Finite Concrete Logics: Their Structure and Measures on Them <i>Peter G. Ovchinnikov and Foat F. Sultanbekov</i>	147
On Some Duality for Orthoposets <i>Jan Paseka</i>	155
Quantum Logics and Instruments <i>Sylvia Pulmannová</i>	163
States on Effect Algebras That Have the \emptyset -Symmetry Property <i>Kuppusamy Ravindran</i>	175
Weak Observables in MV Algebras <i>Beloslav Riečan</i>	183
Lattices and Quantum Logics with Separated Intervals, Atomicity <i>Zdenka Riečanová</i>	191
Solving Problems on Finite Concrete Logics with the Help of PC <i>Foat Sultanbekov</i>	199
Greechie Diagrams of Small Quantum Logics with Small State Spaces <i>Josef Tkadlec</i>	203
A Linear Programming Method for Finding Orthocomplements in Finite Lattices <i>G. N. Parfionov and R. R. Zapatrine</i>	211
Continuous Measurement of Energy for a Two-Level System <i>Jürgen Audretsch and Michael Mensky</i>	215
The Nondemolition Measurement of Quantum Time <i>V. P. Belavkin and M. G. Perkins</i>	219
Time and Events <i>Ph. Blanchard and A. Jadczyk</i>	227
How the Classical Pointer Moves <i>Thomas Breuer</i>	235
Can 'Unsharp Objectification' Solve the Quantum Measurement Problem? <i>Paul Busch</i>	241

Quantum Gravity and the Problem of Measurement <i>Pedro F. González-Díaz</i>	249
Model of a Joint Measurement of Different Spin Components <i>Peter Kienzler</i>	257
Coherent States and Number-Phase Uncertainty Relations <i>Pekka J. Lahti and Maciej Maczynski</i>	265
Continuously Measured Systems, Path Integrals, and Information <i>Michael Mensky</i>	273
Fuzzy Quantum Logics as a Basis for Quantum Probability Theory <i>Jarosław Pykacz</i>	281
The Hidden Measurement Formalism: What Can Be Explained and Where Quantum Paradoxes Remain <i>Diederik Aerts</i>	291
Interactive Probability Models: Inverse Problems on the Sphere <i>Sven Aerts</i>	305
Hidden Measurements, Automorphisms, and Decompositions in Context-Dependent Components <i>Bob Coecke and Frank Valckenborgh</i>	311
The Structure of the Algebra of Observables in the Intermediate Situation of the ϵ -Model <i>Bart D'Hooghe</i>	323
Toward the Born-Weyl Quantization of Fields <i>Igor V. Kanatchikov</i>	333
Simple New Axioms for Quantum Mechanics <i>N. P. Landsman</i>	343
On the Representation of Quantum Mechanics on a Classical Sample Space <i>Werner Stulpe</i>	349
On Informational Divergences for General Statistical Theories <i>Stephan Zanzinger</i>	357
Systems of Covariance in Relativistic Quantum Mechanics <i>S. Twareque Ali</i>	365
How to Describe the Space-Time Structure with Nets of C^* -Algebras <i>Michael Keyl</i>	375
Unification of Quantum Theory and Relativity <i>P. Leifer</i>	387
Quantum Space-Time and Tetrads <i>Holger Lyre</i>	393
Asymptotic State Vector Collapse and QED Nonequivalent Representations <i>S. N. Mayburov</i>	401

<i>U(2,2) Symmetry as a Common Basis for Quantum Theory and Geometrodynamics</i>	411
<i>Jan J. Stawianowski</i>	
<i>A Note on Dynamics in the Modal Interpretation</i>	421
<i>Guido Bacciagaluppi</i>	
<i>Symmetry and Composition—A Key to the Structure of Physical Logic?</i>	427
<i>Michael Drieschner</i>	
<i>Reichenbach's Common Cause Definition on Hilbert Lattices</i>	435
<i>Gábor Hofer-Szabó</i>	
<i>Context Independence as a Statistical Property of Hidden Variable Theories</i>	443
<i>Federico Laudisa</i>	
<i>Quantum Structures Do Not Exist in Reality</i>	449
<i>László E. Szabó</i>	
<i>Merging Quantum Annealing Computation and Particle Statistics: A Prospect in the Search of Efficient Solutions to Intractable Problems</i>	457
<i>Giuseppe Castagnoli</i>	
<i>Quantum Computation: From the Sequential Approach to Simulated Annealing</i>	463
<i>G. Castagnoli, A. Ekert, and C. Macchiavello</i>	
<i>The Entropy of Open Finite-Level Systems</i>	471
<i>S. M. Chumakov, K.-E., Hellwig, and A. B. Klimov</i>	
<i>Radix-$R > 2$ Quantum Computation</i>	481
<i>S. P. Hotaling</i>	
<i>Energy Requirements in Quantum Communication</i>	487
<i>Lev B. Levitin</i>	
<i>Complexities and Their Applications to Characterization of Chaos</i>	495
<i>Masanori Ohya</i>	
<i>Numerical Computation of Quantum Capacity</i>	507
<i>Masanori Ohya, Dénes Petz, and Noboru Watanabe</i>	
<i>Interference and "Which Way" Information</i>	511
<i>H. Paul</i>	
<i>Equilibrium Statistical Ensembles and Structure of the Entropy Functional in Generalized Quantum Dynamics</i>	519
<i>Stephen L. Adler and L. P. Horwitz</i>	
<i>Wentzel's Path Integrals</i>	531
<i>Salvatore Antoci and Dierck-E. Liebscher</i>	
<i>Phase Dynamics at the SQUID and Macro-Realism</i>	537
<i>F. Hofmann and A. Rieckers</i>	
<i>Time Scales in Quantum Mechanics by a Scattering Map</i>	545
<i>L. Lanz and B. Vacchini</i>	

Properties of Ergodic Projection for Quantum Dynamical Semigroups <i>Andrzej Luczak</i>	555
Convergence of the Schwinger–DeWitt Expansion for Some Potentials <i>V. A. Slobodenyuk</i>	563
Majorization for Products of Measurable Operators <i>Airat Bikchentaev</i>	571
Orthosymmetries and Jordan Triples <i>Georges Chevalier</i>	577
The Ultra-Commutation Relations <i>D. A. Dubin, M. A. Hennings, and A. I. Solomon</i>	585
L^p -Spaces for UHF Algebras <i>Stanisław Goldstein and Viet Thu Phan</i>	593
Determinacy of States and Independence of Operator Algebras <i>Jan Hamhalter</i>	599
States on Partial Rings <i>M. Lynn Krause and Gottfried T. Rüttimann</i>	609
Fuzzy Sets in Macroscopic Quantum Systems <i>A. Rieckers</i>	623

CONTENTS

Positive-Operator-Valued Measures and Projection-Valued Measures of Non-Commutative Time Operators <i>Harald Atmanspacher and Anton Amann</i>	629
Quantum Neural Nets <i>Michail Zak and Colin P. Williams</i>	651
Information-Entropy and Purity of Decoherence Functions <i>N. Linden</i>	685
Consequences of the Noncompactness of the Lorentz Group <i>Hans-Jürgen Schmidt</i>	691
Wigner-Weyl-Moyal Formalism on Algebraic Structures <i>Frank Antonsen</i>	697
Quantum Kinematic Theory of the Poincaré Group in Two-Dimensional Spacetime <i>J. Krause</i>	759
Covariant Canonical Formalism of Fields <i>M. A. Mashkour</i>	785
Finitary Algebraic Superspace <i>R. R. Zapatrin</i>	799
Summing Logarithms in Quantum Field Theory: The Renormalization Group <i>D. G. C. McKeon</i>	817
Gravitational and Electroweak Interactions <i>Dave Pandres, Jr.</i>	827
Irreducible Bases and Correlations of Spin States for Double Point Groups <i>Shi-Hai Dong, Xi-Wen Hou, and Zhong-Qi Ma</i>	841
$U(2)$ Algebraic Model Applied to Stretching Vibrational Spectra of Tetrahedral Molecules <i>Xi-Wen Hou and Zhong-Qi Ma</i>	857
Renormalization of QCD Coupling Constant in Terms of Physical Quantities <i>G. S. Japaridze and K. S. Turashvili</i>	865
Interior Schwarzschild Problem and its Integration <i>Hano Essén</i>	875
Transformations of Single and Double Hypergeometric Series from the Triple Sum Series for the 9-j Coefficient <i>K. Srinivasa Rao and J. Van der Jeugt</i>	891

CONTENTS

Connes' Distance Function on One-Dimensional Lattices <i>Aristophanes Dimakis and Folkert Muller-Hoissen</i>	907
S-Dominating Effect Algebras <i>Stanley Gudder</i>	915
Topological Field Theories Associated with Three-Dimensional Seiberg-Witten Monopoles <i>Yuji Ohta</i>	925
Quantum Mechanics Based on Probability Wave Functions Induced by the Minimum Mean Deviation from Statistical Equilibrium. I <i>Silviu Guiasu</i>	957
Second Quantization of the Dirac Field: Normal Modes in the Robertson-Walker Space-Time <i>Emilio Montaldi and Antonio Zecca</i>	995
Moyal Quantization of $\text{sdiff}(T^{2k/N})$, q -Deformation, and q -Moyal Bracket <i>E. H. El Kinani and A. Ouarab</i>	1011
Quantum Mechanics Based on Probability Wave Functions Induced by the Minimum Mean Deviation from Statistical Equilibrium. II <i>Silviu Guiasu</i>	1019
Constant-Cutoff Approach to Axially Symmetric Dibaryons <i>Nils Dalarsson</i>	1051
Constant-Cutoff Approach to Strangeness Dependence in Radiative Decays of Hyperons <i>Nils Dalarsson</i>	1067
Dynamics of Sine-Gordon Solitons <i>N. Riazi and A. R. Gharaati</i>	1081
Cosmic Ether <i>Roman Tomaschitz</i>	1121
Unified Description of Early Universe with Bulk Viscosity <i>Shri Ram and C. P. Singh</i>	1141
Scalar-Tensor Theory with Torsion and Stellar Structure <i>Ji-Zhong Xu</i>	1151
Charged Kerr-NUT Metric with Lambda-Term and Step-by-Step Extension Method <i>Xu Dian-Yan and Qiu Zong-Yan</i>	1159
Erratum to the paper "Conjunctions, Disjunctions, and Bell-Type Inequalities in Orthoalgebras" <i>Jaroslav Pykacz</i>	1171

CONTENTS

Regularity in Quantum Logic <i>John Harding</i>	1173
Quantum Effects of Mesoscopic RLC Circuit in Squeezed Vacuum State <i>Ji-Sou Wang and Chang-Yong Sun</i>	1213
Coulomb Blockade and Quantum Fluctuation of a Nondissipative Mesoscopic Capacitance Coupled Circuit with Source <i>Zhao-xian Yu and Ye-hou Liu</i>	1217
Realizations of Multimode Quantum Group $SU(2)_{q,s}$ <i>Zhao-xian Yu and Ye-hou Liu</i>	1225
Supermulticonformal Field Theory <i>A. Ourab, E. H. El Kinani, and M. Zakkari</i>	1231
Event-Symmetry for Superstrings <i>Philip E. Gibbs</i>	1243
Conformal Invariance and Gravitational Coupling in Quantum Field Theory <i>H. Salehi</i>	1253
Universal Spin Structure <i>G. Sardanashvily</i>	1265
Hydrogen Atom in N Dimensions <i>Sami M. Al-Jaber</i>	1289
Generalized Ehrenfest Theorem for Nonlinear Schrödinger Equations <i>T. G. Bodurov</i>	1299
Large Numbers and the Time Variation of Physical Constants <i>B. G. Sidharth</i>	1307
No-Blueshift Condition In Wolf Mechanism <i>S. Datta, S. Roy, M. Roy, and M. Moles</i>	1313
Can the Universe Recycle? <i>George L. Murphy</i>	1327
Dynamics, Therodynamics and Time Asymmetry <i>Mario A. Castagnino and Edgard Gunzig</i>	1333

CONTENTS

Solving the Schrödinger Equation for the Feynman Quantum Computer <i>Tino Grams</i>	1423
Entropy of the Quantum Scalar Field in Static Black Holes <i>Jiliang Jing</i>	1441
Analogue of Black Strings in the Yang-Mills Gauge Theory <i>Yuri N. Obukhov</i>	1455
Frequency Shift of Spectral Lines Generated by Multiple Dynamic Scattering <i>S. Datta, S. Roy, M. Roy, and M. Moles</i>	1469
Nuclear Forces and Neutron Stars <i>A. S. Rabinowich</i>	1477
Concept of Experimental Accuracy and Simultaneous Measurements of Position and Momentum <i>D. M. Appleby</i>	1491
Quaternionic Electron Theory: Dirac's Equation <i>Stefano De Leo and Waldyr A. Rodrigues, Jr.</i>	1511
Square-Root Klein-Gordon Operator and Physical Interpretation <i>Kh. Namsrai</i>	1531
New Solitary Wave Solution of the Combined KdV and mKdV Equation <i>Jiefang Zhang</i>	1541
Exact Traveling-Wave Solutions to Bi-Directional Wave Equations <i>Min Chen</i>	1547
Dynamical Trajectories of Simple Mechanical Systems as Geodesics in Space with an Extra Dimension <i>Marek Szydłowski, Andrzej J. Maciejewski, and Jacek Guzik</i>	1569
Percolation on Inhomogeneous Bethe Lattice and Forest Fire Models <i>H. A. Abdusalam</i>	1587
Finite-Time Singularities of Solutions of a Class of Nonlinear Schrödinger Equations <i>A. Karabis, E. Minchev, and A. Rauh</i>	1593
A New Maximum Principle for Impulsive First-Order Problems <i>Daniel Franco and Juan J. Nieto</i>	1607
Ambiguities Appearing in the Study of Time-Dependent Constants of Motion for the One-Dimensional Harmonic Oscillator <i>G. López</i>	1617
Relativistic Equations of Motion from Poisson Brackets <i>Paul Bracken</i>	1625
General Properties of the Liouville Operator <i>I. Antoniou, M. Gadella, and Z. Suchanecki</i>	1641

CONTENTS

Inhomogenous Inverse Differential Realization of Multimode $SU(1, 1)$ Group <i>Zhao-xian Yu and Ye-hou Liu</i>	1655
Quantal Information Entropies for Atoms <i>A. Bhattacharya, B. Talukdar, U. Roy, and Angsula Ghosh</i>	1667
Gauge Theories: Geometry and Cohomological Invariants <i>M. Kachkachi, A. Lamine, and M. Sarih</i>	1681
Weinberg Angle and Pion Beta Decay in the Spinor Strong Interaction Theory <i>F. C. Hoh</i>	1693
Quaternionic Electron Theory: Geometry, Algebra, and Dirac's Spinors <i>Stefano De Leo and Waldyr A. Rodrigues, Jr.</i>	1707
Clifford Fields and the Relativistic Equation of the Nucleon <i>Vittorio Cantoni and Matteo Semplice</i>	1721
Liouville Transformation and Exactly Solvable Schrödinger Equations <i>Robert Milson</i>	1735
Potentials with Convergent Schwinger-DeWitt Expansion <i>V. A. Slobodenyuk</i>	1753
Tolman's Energy of a Stringy Charged Black Hole <i>S. S. Xulu</i>	1773
Gravitational Perturbation Induced by the Intense Laser Pulse <i>Peiyong Ji, Shi-tong Zhu, and Wen-da Shen</i>	1779
Construction of Exact Invariants for Time Dependent Classical Dynamical Systems <i>R. S. Kaushal</i>	1793

CONTENTS

General Techniques for Evaluating Twistor Diagrams <i>J. G. Cardoso</i>	1857
Relativistic Covariant Equal-Time Equation for Quark-Diquark System <i>Valeri V. Dvoeglazov, Sergei V. Khudiyakov, and Svyatoslav B. Solganik</i>	1895
Second-Order Equation from the $(1/2, 0) \oplus (0, 1/2)$ Representation of the Poincaré Group <i>Valeri V. Dvoeglazov</i>	1909
Quantized $(1, 0) \oplus (0, 1)$ Fields <i>Valeri V. Dvoeglazov</i>	1915
Towards an Octonionic World <i>Stefano De Leo and Khaled Abdel-Khalek</i>	1945
Double Soliton Solutions of Belinsky-Zakharov Equation Related to the Self-Dual $SU(N)$ Gauge Fields <i>Guo Jianhong and Zhong Zaizhe</i>	1987
Rest Frame Properties of the Proton <i>George L. Strobel</i>	2001
Generalization of Supersymmetric Quantum Mechanics <i>M. Daoud and Y. Hassouni</i>	2021
Nuclear Field Theory with Chiral Symmetry on a Calabi-Yau Manifold <i>J. A. de Wet</i>	2027
Clebsch-Gordon Coefficient for q, s -Deformed Two-Dimensional Hydrogen Atom <i>Zhao-xian Yu and Ye-hou Liu</i>	2043
Quantum Deformation of the Two-Dimensional Hydrogen Atom in a Magnetic Field <i>Anjana Sinha</i>	2055
Chiral Actions and Einstein's Vacuum Equations <i>D. C. Robinson</i>	2067
Spectral Theory of Perturbative Decays <i>D. Cocolicchio and M. Viggiano</i>	2079

CONTENTS

Quantum and Classical Implication Algebras with Primitive Implications <i>Mladen Pavičić and Norman D. Megill</i>	2091
Indentity Rule for Classical and Quantum Physics <i>Mladen Pavičić</i>	2099
Energy Spectrum of Excitations in the Proca-Chern-Simons System <i>Sze-Shiang Feng, Xi-Jun Qiu, and Zhi-Yuan Zhu</i>	2105
$U(1)$ Connection, Nonlinear Dirac-Like Equations and Seiberg-Witten Equations <i>Liangzhong Hu and Liangyou Hu</i>	2115
Parametric (Anti-) Self-Dual Variables and a Related Parametric Yang-Mills-Like Action in Four-Dimensional Gravity <i>Ya-Bo Wu</i>	2127
Irreducible Bases in Icosahedral Group Space <i>Shi-Hai Dong, Xi-Wen Hou, Mi Xie, and Zhong-Qi Ma</i>	2135
Quantization by Parts, Maximal Symmetric Operators, and Quantum Circuits <i>K. Kong Wan and R. H. Fountain</i>	2153
Quantum Hall Effect <i>A. Jellal</i>	2187
Neutrino Chiral Oscillations <i>Stefano De Leo and Pietro Rotelli</i>	2193
Squeezed States and Non-Diagonal P-Representation <i>A.-S. F. Obada and G. M. Abd Al-Kader</i>	2207
Linear Amplifier and Quasiprobability Distribution Functions for the Squeezed Displaced Fock States <i>A.-S. F. Obada and G. M. Abd Al-Kader</i>	2233
Prefered History Consistent Sets <i>C. Anastopoulos</i>	2261
Black-Reaction of Charged Black Hole <i>Zhang Lichun, Zhao Ren, and Liu Liao</i>	2273
Axiomatic Pregeometry of Space-Time <i>S. E. Perez Bergliaffa, G. E. Romero, and H. Vucetich</i>	2281
Generalized Variable-Coefficient KP Equation <i>Yi-Tian Gao and Bo Tian</i>	2299

CONTENTS

Quantum Logics and Convex Spaces <i>Sylvia Pulmannová</i>	2303
External-Internal Group Quotient Structure for the Standard Model in Analogy to General Relativity <i>Heinrich Saller</i>	2333
Eigenvectors of Backwardshift on a Deformed Hilbert Space <i>P. K. Das</i>	2363
Topological Quantization of Magnetic Monopoles and Their Bifurcation Theory <i>Guohong Yang and Yishi Duan</i>	2371
Time Machines and the Breakdown of Unitarity <i>Frank Antonsen and Karsten Bormann</i>	2383
Jaynes-Cummings Model and Trappings of Atoms <i>Yuanjie Li, Gang Wang, and Ying Wu</i>	2395
Star-Deformation of the Infinite Oscillator Algebra and the Realization of Both q -Deformed Centerless Virasoro and $SU_q(2)$ Algebras <i>M. Mansour</i>	2403
String Cosmology with Brans-Dicke Theory in Higher Dimensional Space-Time <i>Subenoy Chakraborty and Tapan Kumar Ghosh</i>	2409
Complex Geometry and Dirac Equation <i>Stefano De Leo, Waldyr A. Rodrigues, Jr., and Jayme Vaz, Jr.</i>	2415
Two-State Paramagnetism Induced by Tsallis and Renyi Statistics <i>C. Wolf</i>	2433
Alternative Approach to the Concept of Shape Invariance in Quantum Mechanics <i>Cao Xuan Chuan</i>	2439
Multiple Soliton-Like Solutions for $(2+1)$ -Dimensional Dispersive Long- Wave Equations <i>Zhang Jiefang</i>	2449
Lagrangian Structure of the Two-Dimensional Lotka-Volterra System <i>José Fernández-Nuñez</i>	2457

CONTENTS

Isomorphism Transformation Between the Hydrogen Atom and Four-Dimensional Harmonic Oscillator	2463
<i>Gao-Jian Zeng, Sheng-Mei Ao, Xiang-Sheng Wu, and Ka-Lin Su</i>	
Triatomic Vibrational Energies	2481
<i>Chao-Ping liu and J.J. Soares Neto</i>	
Information and Entropy in Quantum Measurement Processes	2491
<i>Masashi Ban</i>	
Front-Form Hamiltonian and BRST Formulations of the Schwinger Model	2539
<i>Usha Kulshreshtha and D. S. Kulshreshtha</i>	
The Error Principle	2557
<i>D. M. Appleby</i>	
Canonical Proper-Time Formulation of Relativistic Particle Dynamics. II	2573
<i>Tepper L. Gill, Woodford W. Zachary, and James Lindesay</i>	
SL(2,C) Gauge Theory of Gravitation and the Quantization of the Gravitational Field	2615
<i>Moshe Carmeli and Shimon Malin</i>	
Is Galaxy Dark Matter a Property of Spacetime?	2621
<i>Moshe Carmeli</i>	
Dynamics of Olivary Neurons	2627
<i>Gin McCollum</i>	
Chaotic Maps, Control Parameter, and Liapunov Exponent	2653
<i>W.-H. Steeb, M. A. van Wyk, and R. Stoop</i>	
MHD Equilibrium Equation with Azimuthal Rotation in a Curvalinear Coordinate System	2657
<i>Ricardo L. Viana</i>	

CONTENTS

<p>Topos Perspective on the Koschen-Specker Theorem: I. Quantum States as Generalized Valuations</p> <p style="padding-left: 40px;"><i>C. J. Isham and J. Butterfield</i></p>	2669
<p>Quantal Information Theory</p> <p style="padding-left: 40px;"><i>H. S Green</i></p>	2735
<p>Fractional Quantum Hall Effect and $(2 + 1)$-Dimensional Quantum Electrodynamics</p> <p style="padding-left: 40px;"><i>A. Jellal</i></p>	2751
<p>Polynomial Invariant of Knots and Links from Two-Parameter Quantum Groups</p> <p style="padding-left: 40px;"><i>E. A. El-Rifai, A. S. Hegazi, and E. Ahmed</i></p>	2757
<p>Relativity and the Quantum</p> <p style="padding-left: 40px;"><i>Theodore P. Jorgensen</i></p>	2763
<p>Fermion-Antifermion Condensate Contribution to the Anomalous Magnetic Moment of a Fundamental Dirac Fermion</p> <p style="padding-left: 40px;"><i>Victor Elias and Kevin Sprague</i></p>	2767
<p>Why Kolmogorov Complexity in Physical Equations?</p> <p style="padding-left: 40px;"><i>Vladik Kreinovich and Luc Longpré</i></p>	2791
<p>Synthetic Differential Supergeometry</p> <p style="padding-left: 40px;"><i>Hirokazu Nishimura</i></p>	2803
<p>Differential Forms in Synthetic Differential Geometry</p> <p style="padding-left: 40px;"><i>Rene Lavendhomme and Hirokazu Nishimura</i></p>	2823
<p>Synthetic Braided Geometry. I</p> <p style="padding-left: 40px;"><i>Hirokazu Nishimura</i></p>	2833
<p>Even for Nonpoint Events, Causality Implies the Lorentz Group</p> <p style="padding-left: 40px;"><i>Mikhail Auguston, Misha Koshelev, and Olga Kosheleva</i></p>	2851
<p>Equivalence Theorem for Higher Order Equations</p> <p style="padding-left: 40px;"><i>C. G. Bollini, L. E. Oxman, and M. C. Rocca</i></p>	2857
<p>Wheeler Propagator</p> <p style="padding-left: 40px;"><i>C. G. Bollini and M. C. Rocca</i></p>	2877
<p>Peristaltic Motion of a Particle-Fluid Suspension in a Planar Channel</p> <p style="padding-left: 40px;"><i>Kh. S. Mekheimer, Elsayed F. El Shehawey, and A. M. Elaw</i></p>	2895

CONTENTS

Announcement	2921
Limit of Classical Projections of Quantum Mechanics as $\hbar \rightarrow 0$ <i>Marcel Polakovič</i>	2923
Superstrings, Knots, and Noncommutative Geometry in $\mathcal{E}^{(z)}$ Space <i>M. S. El Naschie</i>	2935
Topological Invariant in Riemann–Cartan Manifold and Space-Time Defects <i>Guohong Yang, Yishi Duan, and Yongchang Huang</i>	2953
Quantum Deformation of the Lie Superalgebra $spl(2, 1)$ <i>A. Hegazi and M. M. Abd-Elkalek</i>	2965
q-Laguerre Polynomial Realization of $gl_{-\sqrt{q}}(N)$ -Covariant Oscillator Algebra <i>W.-S. Chung</i>	2975
Energy Spectrum of a Two-Parameter Deformed Hydrogen Atom <i>Zhao-xian Yu and Ye-hou Liu</i>	2979
Universal R Matrix of Two-Parameter Deformed Quantum Group $U_{qs}(SU(1, 1))$ <i>Zhao-xian Yu and Ye-hou Liu</i>	2985
Universal R Matrix of Two-Parameter Deformed Quantum Group $U_{qs}(SU(2))$ <i>Zhao-xian Yu and Ye-hou Liu</i>	2989
Star–Products and Quasi–Quantum Groups <i>M. Mansour</i>	2995
Lorentz-Invariant Pseudo-Differential Wave Equations <i>D. G. Barci, C. G. Bollini, L. E. Oxman, and M. C. Rocca</i>	3015
Limits to the Acceleration of Black Holes <i>Zhang Jianhua and Cheng Ziefeng</i>	3031
Entropy in $(1 + 1)$ -Dimensional Black Hole <i>You-Gen Shen and Da-Ming Chen</i>	3041
Rhythmic Behavior Generated by Ensembles of Neurons <i>Patrick D. Roberts</i>	3051
Universal Dynamical Computation in Multidimensional Excitable Lattices <i>Andrew Adamatzky</i>	3069
Quasi-Chaotic Property of the Prime-Number Sequence <i>Richard L. Liboff and Michael Wang</i>	3109
Measures of Information and Error Laws <i>B. H. Lavenda</i>	3119
New Summation Expressions Involving the Gamma Function <i>Harry A. Mavromatis</i>	3139